BLINDNESS, CAUSED BY OPHTHALMIA NEONATORUM *

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The part played by ophthalmia neonatorum in producing blindness is a sadly conspicuous and leading one. It enlists our sympathetic interest because its victims are, in the vast majority of instances, the "little ones," who are powerless to prevent its occurrence and powerless also to make known the early manifestations of a disease which is destroying their sight. In consequence of its ravages, the lives of these defenseless unfortunates are blighted irrevocably, and they are forever consigned to a future of unending darkness. No writer can be charged with unseemly reiteration, no medical tongue accused of boresome repetition, no matter how often or how insistently he dwells on this painful, humiliating truth, namely, that the vast majority of these little ones could have been spared their sad affliction if only the simplest elementary precautions had been observed at the proper time.

Statistics are numerous, indicating the frequency and the proportion of blindness caused by the disease. A study of these, collected by different observers, warrants the conclusion that one-eighth of blindness from all causes is due to this disease, and one-fourth of the blindness among children is attributable to the same cause.

A comparison of statistics from different sources is shown by Tables 1 to 6.

The "Special Reports on the Blind and the Deaf, 1900, Department of Commerce and Labor, Bureau of the United States Census," present the following statistics and comments:

Excluding congenital statistics and injuries, accidents and operations, there are 2,556 who lost sight after birth, but

TABLE 1.—CENSUS RETURNS (ENGLAND AND WALES), 1901

(Harman: Preventable Blindness)

Sex†	1891	1901	Condition as to Marriage, 1901		Ages: Under 5	5-10	10-15	15-20	20-25	25-35	35-45	45-55	55-65	65-75	75-85	85,over
			THE BLIND													
♂	12,281	13,136	Single	5,583	280	373	590	611	573	949	747	553	439	290	151	27
			Married	5,360	...	...	...	...	30	372	854	1,133	1,262	1,053	576	80
			Widowed	2,193	...	...	...	...	...	8	55	157	417	658	685	213
♀	11,186	12,181	Single	5,563	201	296	488	455	503	863	709	621	532	466	335	94
			Married	2,525	...	...	...	1	14	181	322	525	636	60	257	29
			Widowed	4,093	...	...	...	...	...	13	63	239	624	1,262	1,439	453
Total	23,467	25,317														
			BLIND FROM CHILDHOOD‡ (INCLUDED IN FOREGOING)													
♂	2,194	2,468	Single	2,028	280	373	216	264	220	310	185	81	57	31	11	...
			Married	389	...	...	...	...	7	89	110	91	61	23	7	1
			Widowed	51	...	...	...	...	...	...	10	11	12	9	8	1
♀	1,811	2,153	Single	1,954	201	296	164	188	192	332	217	178	99	56	26	5
			Married	143	...	...	...	1	6	41	37	37	14	7	...	...
			Widowed	56	...	...	...	...	...	...	7	10	21	12	5	1
Total	4,005	4,621														

† In this column ♂ denotes males, and ♀ females.

‡ One-third of patients "Blind from Childhood," were blinded by ophthalmia neonatorum (approximately 1,500).

TABLE 2.—PROPORTION OF CASES OF OPHTHALMIA NEONATORUM IN DISEASES OF THE EYE

Illinois Charitable Eye and Ear Infirmary, Chicago
(Years 1909-1910)

(Reports Illinois Charitable Eye and Ear Infirmary, Chicago, 1909-1910)

Total cases eye diseases treated	10,361
Total cases ophthalmia neonatorum	145
Percentage of ophthalmia neonatorum	1.30

Massachusetts Charitable Eye and Ear Infirmary, Boston
(Year 1913)

(Reports Massachusetts Charitable Eye and Ear Infirmary, Boston, 1913)

Total cases eye diseases treated	28,652
Total cases ophthalmia neonatorum	298
Percentage of ophthalmia neonatorum	1.04

Manhattan Eye, Ear and Throat Hospital, New York
(Year 1913)

(Reports Manhattan Eye, Ear and Throat Hospital, New York, 1913)

Total cases eye diseases treated	21,280
Total cases ophthalmia neonatorum	72
Percentage of ophthalmia neonatorum	0.3

New York Eye and Ear Infirmary, New York
(Years 1912-1913)

(Reports New York Eye and Ear Infirmary, New York, 1912-1913)

Total cases eye diseases treated	24,922
Total cases ophthalmia neonatorum	20
Percentage of ophthalmia neonatorum	0.08

TABLE 3.—COMPARATIVE TABLES SHOWING BLINDNESS CAUSED BY OPHTHALMIA NEONATORUM

(Norris and Oliver: System of Ophthalmology, iii.)

	Cases	Per Cent.
Magnus' table of 2,528 cases of blindness in Germany: Ophthalmia neonatorum caused blindness in	275	10.876
Trousseau's table of 625 cases of blindness in France: Ophthalmia neonatorum caused blindness in	29	4.60
Oppenheimer's table of 572 cases of blindness in the United States: Ophthalmia neonatorum caused blindness in	18	3.10

* Read at a joint meeting of the Chicago Medical and Chicago Ophthalmological societies in a "Symposium on Preventable Blindness," May, 1914.

TABLE 4.—THE CAUSES OF BLINDNESS IN LONDON SCHOOL-CHILDREN

(Harman: Preventable Blindness)

(Based on 362 Cases)

	Per Cent.
Congenital defects	25.34
Ophthalmia of new-born	36.36
Congenital syphilis	17.60
Optic atrophy	9.36
Purulent ophthalmia	2.20
Small-pox	0.82
Sympathetic ophthalmia	2.75
Phlyctenular ophthalmia	1.95
Malignant disease	0.27

TABLE 5.—STATISTICS GATHERED BY VARIOUS WORKERS OF BLINDNESS PRODUCED BY OPHTHALMIA NEONATORUM

(Harman: Preventable Blindness)

	Per Cent.
Reinhard, Germany, Austria, Denmark, Holland	40
Claisse, Paris	46
Magnus, Breslau	34
Katz, Berlin	41
Compare with L. C. C. blind schools	36.36

TABLE 6.—CASES OF OPHTHALMIA NEONATORUM FROM THE MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY

(Massachusetts Charitable Eye and Ear Infirmary Reports, 1913)

Year	Number Under Observation	Number Made Partially Blind	Per Cent.
1907-1908	46	12	26
1908-1909	116	29	25
1909-1910	119	13	10.9
1910-1011	107	11	10.2
1911-1912	108	9	8
1912-1913	142	23	16

under 1 year of age, and in 644, or 25.2 per cent. of these cases, the cause of blindness was probably ophthalmia neonatorum, or "babies' sore eyes," since other diseases of the eye causing blindness under 1 year of age are extremely rare. The importance of these figures lies in the fact that

this disease, which is very malignant and which attacks the infant at birth or immediately after and almost always results in total destruction of the sight—usually of both eyes—or in very seriously impaired vision, is now considered preventable, and if proper measures had been instituted at the time of birth, few or none of these cases would have occurred. It is not pertinent in this connection to discuss the means of prevention, which are well known; but it can at least be pointed out, with emphasis, that the so-called "sore eyes" of babies is a highly dangerous affection, and that its treatment should be prompt and energetic and carried out by a thoroughly competent person.

The New York Association for the Blind in a pamphlet[1] on this subject says:

The official census of the blind for the state of New York, taken in 1906, gives a total of 6,200 blind persons in the state. Of these the cases of preventable blindness numbered 1,984, or 32 per cent., of the whole. And of these preventable cases there are 620 classified as blindness caused by ophthalmia neonatorum, or 10 per cent. of the whole number of blind persons in the state of New York. This means that to-day there are over 620 blind persons in this state who would never have been blind had a harmless preparation (Credé's method) been put into their eyes when they were born.

From the same instructive pamphlet Tables 7 and 8 are taken.

Table 7 shows the number of new pupils admitted into ten of the principal schools of this country during the year 1907, and the proportion of those admitted who had lost their sight from ophthalmia of the new-born.

TABLE 7.—NEW PUPILS IN 1907 BLIND FROM OPHTHALMIA

Schools for the Blind	New Admissions	Ophthalmia of New-Born	Per Cent.
N. Y. State School for the Blind, Batavia, N. Y.	13	4	30.76
Penn. Institute for the Blind, Overbrook, Pa.	27	9	33.33
Perkins Institute and Mass. School for the Blind, Boston	43	13	30.23
Colorado School for the Blind, Colorado Springs	7	3	42.85
Western Penn. Institute for the Blind, Pittsburgh	28	8	28.57
Missouri School for the Blind, St. Louis.	19	6	31.57
Conn. State Board of Education for the Blind, Hartford	8	1	12.50
Ohio State School, Columbus	36	7	19.44
Maryland School for the Blind, Baltimore	13	4	30.76
Ontario Institute for the Blind, Brantford, Ont.	23	5	21.73

The average of new admissions in these ten schools for the blind shows that 28.14 per cent. were victims of ophthalmia of the new-born. More than one-quarter of the new pupils admitted during 1907 were therefore needlessly blind.

Table 8 shows the admissions for eight years, 1900-1907, to one school, the Pennsylvania Institute for the Blind, at Overbrook, Pa., and the percentage of pupils admitted each year who had lost their sight from ophthalmia neonatorum.

TABLE 8.—PUPILS BLIND FROM OPHTHALMIA ADMITTED TO PENNSYLVANIA SCHOOL FOR THE BLIND

Year		Per Cent.
1900	11 out of 25 =	44
1901	10 out of 28 =	35
1902	9 out of 39 =	23
1903	14 out of 50 =	28
1904	15 out of 58 =	25
1905	21 out of 42 =	50
1906	12 out of 38 =	31
1907	9 out of 34 =	26
1908	11 out of 29 =	37
1909	15 out of 34 =	44

Average for ten years 33.68 plus per cent. needlessly blind.

1. New York Association for the Blind, Special Committee on Prevention of Blindness.

It is instructive also to note the statistics given in this pamphlet relative to the activity of midwives in obstetric practice:

In Chicago, in 1904, we find 86 per cent. of all births, principally among Italians, reported by midwives. In Buffalo, N. Y., with a population of about 400,000, nearly one-half of the births, in one year, were attended by midwives. In New York City, in 1905, 43,834 births, or 42 per cent., of the whole number, were attended by midwives, employed largely by Italians, Austro-Hungarians, Polish Jews and other immigrants. For the year 1907, in New York City, there were 68,186 births reported by physicians, and 52,536 reported by midwives. In September, 1908, the registered midwives in the five boroughs of New York City numbered 1,382.

The author of these reports well concludes:

In the face of these figures it is idle to talk of the elimination of the midwife. . . . Let us see to it that our midwives are trained, controlled and made fit for the responsible duties they undertake to perform.

The economic side of the question is likewise a matter of considerable moment. It is estimated that it costs the state $3,000 to educate a blind child. The proper equipment and maintenance of blind schools, etc., likewise require a considerable expenditure. To these sums may be added the loss to the individual in earning capacity, the curtailing of "avenues of opportunity," etc., which his affliction necessarily imposes.

The disease itself—its etiology, pathology, clinical course and treatment—while not properly within the scope of the present consideration, may be given a brief reference.

Ophthalmia neonatorum is an acute purulent conjunctivitis occurring in the new-born. The cause of the infection is the gonococcus of Neisser. Bacteriologic examination has demonstrated that cases occurring before the end of the third day are almost always due to the neisserian infection. Later infections are usually produced by the Koch-Weeks bacillus, the pneumococcus, the Klebs-Loeffler bacillus, etc.

It is generally admitted that infection, as a rule, takes place from the vaginal secretion of the mother entering the conjunctival sacs during the period of the passage of the child's head along the genital tract. Ante-partum infections are recognized as of rare occurrence; post-partum infections from soiled linen, etc., also occur.

The appearance of an eye suffering from ophthalmia neonatorum varies according to the stage of the infection. At the outset, the conjunctiva is reddened; by the third day the lids are glued together with mucopus, the lids become swollen, and as the process develops, the discharge changes to a copious, creamy pus; the ocular conjunctiva becomes greatly swollen, and difficulty is experienced in separating the lids; the cornea may become hazy and ulcerated; gradually the process subsides, the swelling and discharge diminish, and the disease passes into a subacute stage.

The distinguishing characteristics of the disease are the swollen condition of lids and conjunctiva, and the purulent discharge. Corneal involvement, with its sequelae, is the danger that threatens the integrity of the visual function. It may be accepted as an axiom that a discharging eye is always a dangerous eye; and in the case of an infant, such a discharge occurring within the early days following its birth demands prompt identification and energetic treatment.

As far as the treatment of the disease itself is concerned, the recognized procedures all have this in com-

mon, namely, to negative the action of the invading organism, to keep the eye freed from the purulent secretion, to anticipate corneal involvement, to assist the reparative process and prevent the spread of the infection.

The greatest field of opportunity, however, lies in the prevention. To accomplish the highest degree of success in this direction two important factors must be carried out: first, the utilization of prophylactic measures; second, early recognition and prompt treatment of the disease.

As to prophylactic measures, obstetricians advise—as a routine procedure—the rendering of the genitals and genital tract aseptic by suitable measures; and such procedures, it is recognized, may prove of especial importance in preventing an infection.

The value of the Credé method as a prophylactic measure is generally admitted. At birth the child's eyes are gently cleansed and one drop of 2 per cent. solution of silver nitrate instilled into each eye. Credé, at the Leipsic Lying-in Asylum, had averaged 10.8 per cent. of cases of ophthalmia; after the introduction of this prophylactic method he found that the infections were reduced to from 0.1 to 0.2 per cent.

If this method of prophylaxis were in universal use, it is certain that the proportion of ophthalmia neonatorum cases would be greatly reduced; and if, in conjunction with the method, practical measures might be devised to insure the early recognition and early treatment of the disease, it is not unreasonable to assert that such infections might be almost entirely eradicated.

A survey of the foregoing facts, which embody the observations and the views of numerous earnest workers in this humanitarian field, causes one to pause and reflect on the colossal problem of prevention which is presented. The committee of the Chicago Opthalmological Society is determined to do what little it may in ameliorating the conditions and, if possible, inaugurate in the state of Illinois a practical campaign of prevention.

A cursory study of the situation discloses many perplexing problems which only patience, perseverance, discretion and cooperation may overcome. The plan proposed and carried out by the New York Association for the Blind appeals to our committee as one most likely to accomplish the largest measure of success, and at present we are engaged in attacking the problem along the lines suggested.

This plan is described by the New York Association for the Blind as follows:

> The methods of work for the suppression of infant ophthalmia may be divided into the following groups:
>
> 1. Educational.
> 2. Legislative.
> 3. Cooperative.
>
> *Educational.*—Through the preparation, publication and dissemination of printed matter, emanating from the committee or approved by it; through public lectures, addresses and exhibits; and by means of the press, on whose generous assistance the committee greatly relies.
>
> The object sought is to spread among the general public the knowledge that infant ophthalmia is a dangerous, infectious disease, fatal to sight unless checked at the time of the birth of the child, easily preventable then if simple precautions are taken; to inform parents, more especially, of the dangers which threaten the sight of their children at birth, and the preventive measures which should be taken; and to advocate the universal adoption of such measures.
>
> *Legislation.*—To promote such legislation as may be needed to accomplish the object in view—the prevention of the unnecessary blindness of infants.
>
> *Cooperation.*—In furtherance of the same object, the committee seeks and invites cooperation with medical societies, health officers, ophthalmic, maternity and other hospitals in which children are born, dispensaries, city missions, settlements; with schools, institutions and associations for the blind, and with all societies engaged in work for children and for social betterment; with district visiting nurses, and with all persons who are already engaged in this work or who desire to help in it.

The foregoing "plan of campaign" appears logical and practical, and in conducting the work along these lines our committee is sanguine that a measure of success will be attained which shall serve to place our own state in a creditable position on the question of the prevention of blindness due to ophthalmia neonatorum. Even a small measure of success will be a distinct accomplishment, and will contribute a not inconsiderable part toward sparing many little ones the sad ravages which this baneful disease inflicts.

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MANAGEMENT OF DELICATE AND PREMATURE INFANTS IN THE HOME*

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The premature or delicate infant has an equal right to life with the robust. Indeed, its frail condition should insure it every possible care, since because of its feebleness its life's prospect is not nearly so good. While I have no available data, such at least is my personal experience. The fact that I have seen several striking examples of the possibilities of saving the lives of some of these cases and believe that not sufficient care in their management is practiced, is my excuse for presenting this brief paper.

The two general requirements in the care of premature infants are the maintenance of body heat, and proper nourishment.

I. THE MAINTENANCE OF BODY HEAT

In order to sustain life, body heat must be maintained and also the rapid dissipation of heat prevented. Heat is given off from the body by the excretions and feces and urine, by the lungs in the form of vapor, and from the skin. Vierordt states that 73 per cent. of body heat is eliminated by radiation and conduction from the skin. This heat loss can be greatly limited. My experience in a number of cases with the modern incubator has not been satisfactory. The infants live a few days and then die even when they are not losing weight. For the last several years I have adopted the following method. It is not at all original and the method is described in some of our modern text-books.

I direct that an ordinary clothes-basket 24 inches long be procured. This can be purchased in any village. The bottom is padded so that the basket has a depth of 8 inches. It is then lined with white oilcloth and over this a layer of cotton batting held in place by being stitched through the sides of the basket. This in turn is covered with white flannel. The flannel

* Read before the Section on Diseases of Children at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.